REMARKS

Claims 1-10, 12, 13, 16-18, 64, and 65 are pending. Claim 1 is an independent claim. Claims 19-63 were previously withdrawn responsive to a requirement for restriction. Claims 11, 14, and 15 were previously cancelled without prejudice. In this response, claim 1 is amended. No new matter is added. Reconsideration and allowance of the above-referenced application are respectfully requested.

Interview Summary

Examiner Anna Skibinsky is thanked for the courtesy of the telephone interview held with Applicants' representative, Sushil Shrinivasan, on September 23, 2008. During the interview, rejections of claims under 35 U.S.C. §101 and matters related to the priority date claimed by the present application were discussed.

35 U.S.C. §101

Claims 1-10, 12, 13, 16-18, and 64-65 stand rejected under 35 U.S.C. §101 for being directed to non-statutory subject matter. Amendments to claim 1 obviate the rejections of these claims under 35 U.S.C. §101.

As amended, claim 1 recites "a processor to perform operations comprising: receiving an input signal including events of interest within an arrayed signal pattern; performing active interferometric analysis on the received input signal using an expresser function to detect the presence of an event of interest within the arrayed signal pattern via a computationally induced interference mechanism, wherein the event of interest is processed in a different way than other events within the arrayed signal pattern; obtaining the event of interest from the input signal; and providing the obtained event of interest as output." (Emphasis added).

In support of the rejection, the Office Action states "The process of performing interferometric [sic] analysis on a signal and processing an event of interest is non-statutory because there is neither a physical transformation or a concrete, tangible, and useful result such as a real world result or an output of data to a user." *See, Office Action*, page 4, last paragraph.

As amended, claim 1 recites, in part, "providing the obtained event of interest as output." The concrete, tangible, and useful result of the features of claim 1 includes the obtaining of an event of interest from events within an arrayed signal pattern. Further, the real world result includes providing the event of interest as an output. At least for these reasons, claim 1, as amended, is statutory. Accordingly, Applicants respectfully request that the rejection of claim 1 and all claims dependent therefrom under 35 U.S.C. §101 be withdrawn.

35 U.S.C. 103(a)

Claims 1-10, 12, 13, 16-18, and 64-65 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Pfeifer et al. (CIRP Annals-Manufacturing Technology, vol. 51, 2002, pp. 455-458), hereinafter "Pfeifer," in view of Vol'pov et al. (Soviet Journal of Quantum Electronics, vol. 20, 1990, pp. 1517-1522), hereinafter "Vol'pov." Applicants respectfully disagree.

As amended, claim 1 relates to a system including a processor that performs operations. An input signal including events of interest within an arrayed signal pattern is received. Active interferometric analysis is performed on the received input signal using an expresser function to detect the presence of an event of interest within the arrayed signal pattern via a computationally induced interference mechanism. The event of interest is processed in a different way than other events within the arrayed signal pattern. The event of interest is obtained from the input signal and provided as an output.

Neither Pfeifer nor Vol'pov, taken alone or in any combination, describe or suggest all the features of claim 1. Specifically, for example, the suggested combination of Pfeifer and Vol'pov does not teach "receiving an input signal including events of interest within an arrayed signal pattern," "obtaining the event of interest from the input signal, and providing the obtained event of interest as output," as claimed.

Pfeifer describes a procedure for the assessment of the measurement uncertainty of interferometers with the help of a virtual instrument, the so-called "Virtual Interferometer." *See, e.g., Pfeifer* at Abstract. Pfeifer highlights difficulties in separating individual sources of error in interferometric measurements performed using a real

interferometer. *See, e.g., Pfeifer*, page 1523, col. 1. To alleviate these difficulties, Pfeifer proposes a systematic investigation of errors in an interferometer and their effects on a specific measurement by simulating the interferometric measurements in a virtual environment. *Id.* To do so, Pfeifer describes a virtual interferometer that allows a realistic reproduction of any physical interferometer in a computer and "enables simulation of <u>interferometrical measurements</u> under accurately specified, and thus, perfectly known conditions." *Id.* (Emphasis added).

Further, Pfeifer describes that the virtual interferometer uses non-sequential ray-tracing for the calculation of optical path differences and fringe patterns to analyze ray propagation. *See, e.g., Pfeifer*, 1523, col. 2. In addition, Pfeifer describes that the individual components of the interferometer are modeled using 3D solid models and optical transmission through the components is modeled using ray-tracing software. *See, Pfeifer,* page 1524, col. 1.

Also, Pfeifer describes studying an effect of error influences, e.g., temperature variations, on the mounting devices of the interferometer on the interferometric measurements. To do so, Pfeifer describes exporting each component of the interferometer into a finite element software application, ANSYS, analyzing each interferometer component, and exporting each component back to virtual interferometer to simulate interferometric measurements. Thus, Pfeifer teaches a virtual interferometer performing simulated interferometric measurements.

Pfeifer does not teach receiving an input signal including events of interest within an arrayed signal pattern as claimed. In fact, Pfeiffer does not teach receiving any kind of input signal. Because Pfeifer simulates the interferometric measurement of a virtual interferometer, Pfeifer performs no interferometric analysis and, consequently, does not receive any input signal. Because Pfeifer does not teach receiving an input signal, Pfeifer certainly does not teach obtaining the event of interest from the input signal or providing the obtained event of interest as an output. At least for this reason, Pfeifer does not teach all the features of claim 1.

The Office contends that because Pfeifer teaches obtaining the effect of temperature variations, Pfeifer teaches obtaining the event of interest. Applicants respectfully disagree. As described previously, Pfeifer describes studying an effect of

error influences, e.g., temperature variations, on the mounting devices of the interferometer. In this regard, Pfeifer states:

> Some error influences, e.g., temperature variations that can exceed several Kelvin per year or mechanical stress introduced by mounting devices leading to deformations of the optical components, can not be simulated by conventional ray-tracing software. But with finite element analysis [9] in conjunction with the Virtual Interferometer the effect of these error sources on the measurement uncertainty of interferometrical measurements can thoroughly be examined.

See, Pfeifer, page 1524, col.s 1 and 2.

As set forth in Pfeifer, finite element analysis is used to model an effect of temperature variations or mechanical stress on the interferometer itself. Further, Pfeifer's virtual interferometer does not model the temperature variations or the mechanical stress because Pfeifer's ray-tracing software employed by the virtual interferometer cannot do so. Regardless, Pfeifer does not describe <u>obtaining</u> temperature variations from the input signal. Rather, Pfeifer describes modeling an effect of temperature variations using finite element analysis and using the modeled components in ray-tracing software that simulates interferometric measurements. Furthermore, Pfeifer does not describe an input signal including events of interest within an arrayed signal pattern.

Thus, contrary to the Office's contention, Pfeifer does not describe "obtaining the event of interest from the input signal," as claimed. The Office Action states:

> Pfeifer et al. teach a virtual interferometer that simulates interferometric [sic] measurements in a virtual environment to reproduce a physical interferometrical measurements in a computer (i.e. computationally induced interference; processor) (page 455, col. 5, ¶5, as in claim 1.

See, Office Action, page 6, last paragraph.

Thus, the Office contends that Pfeifer's virtual interferometer is the claimed computationally induced interference mechanism. Applicants respectfully disagree.

The claimed processor performs active interferometric analysis on the received input signal <u>via a computationally induced interference mechanism</u>. Thus, as claimed, the computationally induced interference mechanism is used for performing <u>active</u>

interferometric analysis. Pfeifer does not teach that the virtual interferometer is for performing interferometric analysis. Rather, Pfeifer teaches that the virtual interferometer uses ray-tracing software to simulate interferometric measurements by simulating the paths of optical rays passing through the optical components of a physical interferometer. Applicants respectfully submit that the interferometric measurement simulated by Pfeifer is not the interferometric analysis performed by the claimed processor. Because Pfeifer's computing capabilities are used to simulate interferometric measurements and not to perform active interferometric analysis, as claimed, Pfeifer does not teach the claimed computationally induced interference mechanism.

In addition, the Office concedes that Pfeifer does not teach "receiving an input signal including events of interest" or "performing active interferometric analysis using an expressor function," as claimed. *See, e.g., Office Action*, page 7, 8th paragraph. Applicants respectfully submit that if Pfeifer does not "receive" an input signal including events of interest then Pfeifer necessarily cannot "obtain" an event of interest from the input signal.

Therefore, Pfeifer does not teach all the features of claim 1. Vol'pov does not rectify the deficiencies of Pfeifer. Vol'pov describes active interferometric method for construction of images of small objects observed across a turbulent atmosphere. *See, Vol'pov,* at Title. Vol'pov theoretically analyzes the method of synthesis of a complex Fourier spectrum of a distant small object observed across a turbulent atmosphere. *See, e.g., Vol'pov*, at Abstract. Vol'pov describes synthesizing the spectrum by active interferometry involving illumination of the object by two collimated coherent light beams. *Id.* Vol'pov also describes showing that the modulus and the phase of the Fourier spectrum can be determined separately by averaging different characteristics of the recorded integrated intensity of the reflected radiation and by altering the spatial separation of the two collimated beams. *Id.* Vol'pov does not teach all the features of claim 1.

In this regard, Vol'pov does not describe or suggest receiving the claimed input signal including events of interest within an arrayed signal pattern. In contrast, Vol'pov describes a photodetector receiving radiation reflected from an object at two

wavelengths, where the light incident on the object is from a laser source. *See, e.g., Vol'pov,* page 1521, col. 1 – col. 2. In Vol'pov, the light reflected by the object is not included in events of interest within an arrayed signal pattern. In contrast, the light is reflected by a single object and is incident on a photodetector. Because Vol'pov describes receiving light describing a single object, Vol'pov does not describe receiving an input signal including events of interest within an arrayed signal pattern. Further, because Vol'pov does not receive an input signal including events of interest, Vol'pov certainly does not describe obtaining the event of interest from the input signal.

Thus, neither Pfeifer nor Vol'pov describe or suggest "receiving an input signal including events of interest within an arrayed signal pattern," "obtaining the event of interest from the input signal," or "providing the obtained event of interest as output," as recited in claim 1. Therefore, the suggested combination does not teach all the features of claim 1.

Further, the Office contends that it would have been obvious to combine Pfifer and Vol'pov. Applicants respectfully disagree because the proposed combination will change the principle of operation of the cited references which is impermissible. In this regard, the MPEP states:

> If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims prima facie obvious. In re Ratti, 270 F.2d 810, 123 USPQ 349 (CCPA 1959).

See, MPEP §2143.01.VI.

Thus, based on the MPEP, if the proposed combination of Pfeifer and Vol'pov would change the principle of operation of either Pfeifer or Vol'pov, then the teachings of the two cited references are not sufficient to render claim 1 *prima facie* obvious.

As described previously, Pfeifer teaches a virtual interferometer employing ray-tracing software to simulate interferometer measurements performed by an interferometer whose components are modeled, imported into ANSYS software, analyzed using finite element analysis, and exported to the virtual interferometer. Thus, Pfeifer does not teach performing active interferometric analysis or a computationally induced interference mechanism to do so. Also, as described previously, Vol'pov

teaches synthesizing a complex Fourier spectrum of a distant small object observed across a turbulent atmosphere. Vol'pov's techniques for synthesizing a complex Fourier spectrum cannot simulate interferometric measurements. Further, Pfeifer's virtual interferometer cannot synthesize complex Fourier spectra. So, a combination of Pfeifer and Vol'pov would necessarily require modifying the principle of operation of either Pfeifer's virtual interferometer or Vol'pov's spectrum synthesizing features.

Consequently, such modification will require a substantial reconstruction and redesign of the elements shown in the primary reference as well as a change in the basic principle under which either Pfeifer or Vol'pov was designed to operate. As described in the MPEP, in case of such modification, the teachings of the references are not sufficient to render the claims *prima facie* obvious. Because the proposed combination of Pfeifer and Vol'pov will require a modification of the principle of operation of the references, the proposed combination does not render claim 1 *prima facie* obvious.

Thus, the proposed combination of Pfeifer and Vol'pov does not describe or suggest all the features of claim 1. Further, a *prima facie* case of obviousness has not been established. Accordingly, claim 1 and all claims dependent therefrom are patentable.

CONCLUSION

It is believed that all of the pending claims have been addressed. However, the absence of a reply to a specific rejection, issue or comment does not signify agreement with or concession of that rejection, issue or comment. In addition, because the remarks made above may not be exhaustive, there may be reasons for patentability of any or all pending claims (or other claims) that have not been expressed. Finally, nothing in this paper should be construed as an intent to concede any issue with regard to any claim, except as specifically stated in this paper, and the amendment of any claim does not necessarily signify concession of unpatentability of the claim prior to its amendment.

In view of the foregoing amendments and remarks, Applicants respectfully submit that the application is in condition for allowance, and such action is respectfully requested at the Examiner's earliest convenience.

Applicant asks that all claims be allowed. Please apply a one-month Petition for Extension of Time fee, and any credits or additional charges, to deposit account 06-1050.

Respectfully submitted,

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